Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Original) A valve timing control system for an internal combustion engine, comprising:

a drive force transmitter driven by means of a crank shaft of the internal combustion engine;

a cam shaft having an external periphery which is formed with a drive cam for operating a valve of the internal combustion engine, the cam shaft being so fitted with the drive force transmitter as to rotate the drive force transmitter relative to the cam shaft when so required, the cam shaft being a follower which is rotated with a drive force transmitted from the drive force transmitter;

a housing rotating integrally with one of the drive force transmitter and the cam shaft;

a vane rotor housed in the housing, and rotating integrally with the other of the drive force transmitter and the cam shaft;

an advanced angle chamber and a delayed angle chamber disposed in the housing, and rotating the vane rotor with an oil pressure;

an oil pressure conveyer communicating to the advanced angle chamber and the delayed angle chamber, the oil pressure conveyer supplying the oil pressure selectively to one of the advanced angle chamber and the delayed angle chamber while draining the oil pressure selectively from the other of the advanced angle chamber and the delayed angle chamber;

a protrusion shaft formed on at least one of the vane rotor and the housing, the protrusion shaft protruding forward;

a target plate mounted on at least the one of the vane rotor and the housing, the target plate being formed substantially flat and fitted to the protrusion shaft; and

a sensor disposed in a vicinity of the target plate, the sensor detecting a rotational angle of the target plate.

2. (Original) The valve timing control system for the internal combustion engine as claimed in claim 1, in which the target plate is formed through a press molding.

3. (Original) The valve timing control system for the internal combustion engine as claimed in claim 1, in which the target plate is fixed to the protrusion shaft through a press fitting.

4. (Original) The valve timing control system for the internal combustion engine as claimed in claim 1, in which the target plate has an internal periphery and an external periphery, the external periphery facing the sensor and being thinner than the internal periphery.

5. (Withdrawn) The valve timing control system for the internal combustion engine as claimed in claim 1, in which the target plate is formed with a stopper for stopping a rotation of the target plate relative to the protrusion shaft.

6. (Withdrawn) The valve timing control system for the internal combustion engine as claimed in claim 5, in which the stopper is a key slot receiving a key so as to prevent the rotation of the target plate relative to the protrusion shaft.

7. (Currently Amended) ~~The~~ A valve timing control system for ~~the~~ an internal combustion engine ~~as claimed in claim 1, in which~~ comprising:

a drive force transmitter driven by means of a crank shaft of the internal combustion engine;

a cam shaft having an external periphery which is formed with a drive cam for operating a valve of the internal combustion engine, the cam shaft being so fitted with the drive force transmitter as to rotate the drive force transmitter relative to the cam shaft when so required, the cam shaft being a follower which is rotated with a drive force transmitted from the drive force transmitter;

a housing rotating integrally with one of the drive force transmitter and the cam shaft;

a vane rotor housed in the housing, and rotating integrally with the other of the drive force transmitter and the cam shaft;

an advanced angle chamber and a delayed angle chamber disposed in the housing, and rotating the vane rotor with an oil pressure;

an oil pressure conveyer communicating to the advanced angle chamber and the delayed angle chamber, the oil pressure conveyer supplying the oil pressure selectively to one of the advanced angle chamber and the delayed angle chamber while draining the oil pressure selectively from the other of the advanced angle chamber and the delayed angle chamber;

a protrusion shaft formed on at least one of the vane rotor and the housing, the protrusion shaft protruding forward;

a target plate mounted on at least the one of the vane rotor and the housing, the target plate being formed substantially flat and fitted to the protrusion shaft; and

a sensor disposed in a vicinity of the target plate, the sensor detecting a rotational angle of the target plate,

wherein a supply-drain passage shaft is fixedly disposed in the internal combustion engine,

the supply-drain passage shaft being for supplying an operation oil to the advanced angle chamber and for draining the operation oil from the advanced angle chamber, and

the supply-drain passage shaft being for supplying the operation oil to the delayed angle chamber and for draining the operation oil from the delayed angle chamber;

a connection hole is defined from a head end of the protrusion shaft disposed on the vane rotor to substantially a center of a shell section of the vane rotor;

the supply-drain passage shaft is so inserted into the connection hole as to rotate relative to the connection hole; and

a seal ring is disposed between the connection hole and the supply-drain passage shaft.

8. (Currently Amended) ~~The~~ A valve timing control system for ~~the~~ an internal combustion engine ~~as claimed in claim 1, in which~~ comprising:

a drive force transmitter driven by means of a crank shaft of the internal combustion engine;

a cam shaft having an external periphery which is formed with a drive cam for operating a valve of the internal combustion engine, the cam shaft being so fitted with the drive force transmitter as to rotate the drive force transmitter relative to the cam shaft when so required, the cam shaft being a follower which is rotated with a drive force transmitted from the drive force transmitter;

a housing rotating integrally with one of the drive force transmitter and the cam shaft;

a vane rotor housed in the housing, and rotating integrally with the other of the drive force transmitter and the cam shaft;

an advanced angle chamber and a delayed angle chamber disposed in the housing, and rotating the vane rotor with an oil pressure;

an oil pressure conveyer communicating to the advanced angle chamber and the delayed angle chamber, the oil pressure conveyer supplying the oil pressure selectively to one of the advanced angle chamber and the delayed angle chamber while draining the oil pressure selectively from the other of the advanced angle chamber and the delayed angle chamber;

a protrusion shaft formed on at least one of the vane rotor and the housing, the protrusion shaft protruding forward;

a target plate mounted on at least the one of the vane rotor and the housing, the target plate being formed substantially flat and fitted to the protrusion shaft; and

a sensor disposed in a vicinity of the target plate, the sensor detecting a rotational angle of the target plate,

wherein the target plate has an internal periphery which is formed with a boss section embossed axially, and

the target plate is press fitted to the protrusion shaft for fixation in such a manner that the boss section is positioned on a side defining a root of the protrusion shaft.

9. (Withdrawn) The valve timing control system for the internal combustion engine as claimed in claim 1, in which

the target plate has an internal periphery which is so bent through a press molding as to form a cross section shaped substantially into an alphabetical U, and

an inner cylindrical wall formed inside the internal periphery of the target plate is press fitted to the protrusion shaft for fixation.

10. (Withdrawn) The valve timing control system for the internal combustion engine as claimed in claim 9, in which

the internal periphery of the target plate further has a bottom section for forming the cross section shaped substantially into the alphabetical U, and

the inner cylindrical wall of the target plate is press fitted to the protrusion shaft from the bottom section of the target plate.

11. (Original) The valve timing control system for the internal combustion engine as claimed in claim 1, in which the drive force transmitter is a chain sprocket.

12. (Currently Amended) A valve timing control system for an internal combustion engine, comprising:

a drive force transmitter driven by means of a crank shaft of the internal combustion engine;

a cam shaft having an external periphery which is formed with a drive cam for operating a valve of the internal combustion engine, the cam shaft being so fitted with the drive force transmitter as to rotate the drive force transmitter relative to the cam shaft when so required, the cam shaft being a follower which is rotated with a drive force transmitted from the drive force transmitter;

a rotation control mechanism disposed between the drive force transmitter and the cam shaft, the rotation control mechanism supplying an oil pressure from an outside and draining the oil pressure to the outside so as to control the ~~derive~~ drive force transmitter to rotate relative to the cam shaft;

a target plate mounted on at least one of the drive force transmitter and the cam shaft, the target plate comprising:

a plurality of detector protrusions protruding radially outward and disposed at regular angular intervals circumferentially on the target plate, the detector protrusions being substantially equal in width, each two of the detector protrusions defining therebetween a first pulse interval of a detection signal, and

one index protrusion protruding radially outward and disposed between two of the detector protrusions that are predetermined and adjacent to the one index protrusion, the one index protrusion being substantially equal in width to any one of the detector protrusions, the one index protrusion and the any one of the detector protrusions defining therebetween a second pulse interval of the detection signal, the second pulse interval being shorter than the first pulse interval; and

a sensor for detecting the plurality of the detector protrusions and the one index protrusion of the target plate, so as to detect a rotational position of the drive force transmitter and a rotational position of the cam shaft, by the following steps of:

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detecting a point in time when the first pulse interval is reduced to the second pulse interval shorter than the first pulse interval, and

determining the point in the time as an arrival of the one index protrusion at a detection position of the sensor.

13. (Original) The valve timing control system for the internal combustion engine as claimed in claim 12, in which

the target plate has an internal periphery; and

each of the detector protrusion and the index protrusion of the target plate protrudes from the internal periphery of the target plate, and is thinner than the internal periphery of the target plate.

14. (Original) The valve timing control system for the internal combustion engine as claimed in claim 12, in which the rotation control mechanism comprises:

a housing rotating integrally with one of the drive force transmitter and the cam shaft,

a vane rotor housed in the housing, and rotating integrally with the other of the drive force transmitter and the cam shaft,

an advanced angle chamber and a delayed angle chamber each of which is disposed in the housing and rotates the vane rotor with the oil pressure; and

an oil pressure conveyer communicating to the advanced angle chamber and the delayed angle chamber, the oil pressure conveyer supplying the oil pressure selectively to one of the advanced angle chamber and the delayed angle chamber while draining the oil pressure selectively from the other of the advanced angle chamber and the delayed angle chamber.

15. (Original) The valve timing control system for the internal combustion engine as claimed in claim 12, in which the detector protrusions are three in number.

16. (Original) The valve timing control system for the internal combustion engine as claimed in claim 12, in which the drive force transmitter is a chain sprocket.

17. (Original) A valve timing control system for the internal combustion engine, comprising:

a protrusion shaft; and

a target plate fixed to the protrusion shaft, the target plate being formed substantially flat, comprising:

a plurality of detector protrusions protruding radially outward and disposed at regular angular intervals circumferentially on the target plate, the detector protrusions being substantially equal in width, each two of the detector protrusions defining therebetween a first pulse interval of a detection signal, and

one index protrusion protruding radially outward and disposed between two of the detector protrusions that are predetermined and adjacent to the one index protrusion, the one index protrusion being substantially equal in width to any one of the detector protrusions, the one index protrusion and the any one of the detector protrusions defining therebetween a second pulse interval of the detection signal, the second pulse interval being shorter than the first pulse interval.

18. (Original) The valve timing control system for the internal combustion engine as claimed in claim 17, in which

the target plate is formed through a press molding, and

the target plate is fixed to the protrusion shaft through a press fitting.

19. (New) The valve timing control system for an internal combustion engine as claimed in claim 1, in which the target plate is a member different from the protrusion shaft.

20. (New) The valve timing control system for an internal combustion engine as claimed in claim 17, in which the target plate is a member different from the protrusion shaft.

Amendments to the Drawings:

The formal drawing Replacement Sheets attached in connection with the above-identified application containing Figures 1, 2, 7-9, and 12 are being presented as new formal drawing sheets to be substituted for the previously submitted drawing sheets. The drawing figures 1, 2, 7-9, and 12 have been amended and the specific changes which have been made are listed below:

FIGURE 1:

Element "B" (both occurrences) have been relabeled --II--; and
Element "C" has been relabeled --III, VI--.

FIGURE 2:

Element "A" (both occurrences) have been relabeled --I--.

FIGURE 7:

Element "E" (both occurrences) have been relabeled --VIII--.

FIGURE 8:

Element "D" (both occurrences) have been relabeled --VII--.

FIGURE 9:

Element "F" (both occurrences) have been relabeled --X--.

FIGURE 12:

Element "G" (both occurrences) have been relabeled --XIII--.